

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>AMS . P52675WO</b>	<b>FOR FURTHER ACTION</b> <small>see Form PCT/ISA/220 as well as, where applicable, item 5 below.</small>	
International application No. <b>PCT/EP2004/050527</b>	International filing date (day/month/year) <b>15/04/2004</b>	(Earliest) Priority Date (day/month/year) <b>15/04/2003</b>
Applicant  <b>WESTERNGECO SEISMIC HOLDINGS LIMITED</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 7 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box II).

3. ☒ **Unity of invention is lacking** (see Box III).

**4. With regard to the title,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

**5. With regard to the abstract,**

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

**6. With regards to the drawings,**

a. the figure of the **drawings** to be published with the abstract is Figure No. 1

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/050527

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G01V1/38

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 G01V

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 018 053 A (SHELL INT RESEARCH) 29 October 1980 (1980-10-29)	1-6,8, 12, 14-16, 18,19, 26, 32-37, 41, 43-45, 52, 58-60,62
Y	abstract; figures 1-4,6  page 2, line 12 - line 18 page 10, line 27 - page 11, line 14 ----- -/--	7,9-11, 13, 38-40, 42,61

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

**\* Special categories of cited documents :**

- "A" document defining the general state of the art which is not considered to be of particular relevance  
 "E" earlier document but published on or after the international filing date  
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  
 "O" document referring to an oral disclosure, use, exhibition or other means  
 "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone  
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.  
 "&" document member of the same patent family

Date of the actual completion of the international search

12 October 2004

Date of mailing of the international search report

04.01.2005

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
 Fax: (+31-70) 340-3016

Authorized officer

De Bekker, R

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/050527

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 01/61380 A (SCHLUMBERGER CA LTD ; SCHLUMBERGER SERVICES PETROL (FR); LINDTJORN OLA) 23 August 2001 (2001-08-23)  page 6, line 8 - line 9 page 7, line 22 - page 8, line 13 -----	7,9-11, 13, 38-40, 42,61
X	US 4 748 599 A (GJESTRUM EINAR ET AL) 31 May 1988 (1988-05-31) abstract; figures 1-4 column 2, line 8 - line 19 -----	1,4,26
X	US 4 323 989 A (HUCKABEE KERMIT D ET AL) 6 April 1982 (1982-04-06) abstract; figures 1-3,7 column 3, line 51 - line 54 column 5, line 13 - line 33 -----	1,2,4,26
X	EP 0 168 959 A (TEXAS INSTRUMENTS INC) 22 January 1986 (1986-01-22) abstract; figures 1,4,5 page 4, line 18 - line 23 -----	1,4-6
X	US 4 845 686 A (BRAC JEAN) 4 July 1989 (1989-07-04) abstract; figure 1 column 4, line 29 - line 38 -----	1,2,5,6
X	US 6 011 753 A (CHIEN LORING C) 4 January 2000 (2000-01-04) abstract; figure 1 column 3, line 3 - line 15 -----	1,5,6,8, 26

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/050527

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0018053	A	29-10-1980	AU 534900 B2	23-02-1984
			AU 5767880 A	30-10-1980
			EP 0018053 A1	29-10-1980
			GB 2047406 A ,B	26-11-1980
			JP 1474471 C	18-01-1989
			JP 55144573 A	11-11-1980
			JP 63021876 B	09-05-1988
			MY 16185 A	31-12-1985
			NO 801153 A ,B,	27-10-1980
			NZ 193503 A	18-11-1983
WO 0161380	A	23-08-2001	AU 3045201 A	27-08-2001
			CA 2400246 A1	23-08-2001
			GB 2364388 A ,B	23-01-2002
			WO 0161380 A2	23-08-2001
			NO 20023744 A	17-10-2002
US 4748599	A	31-05-1988	NO 855143 A	19-06-1987
			DE 3643363 A1	03-09-1987
			FR 2591755 A1	19-06-1987
			GB 2184413 A ,B	24-06-1987
US 4323989	A	06-04-1982	NONE	
EP 0168959	A	22-01-1986	CA 1241103 A1	23-08-1988
			DE 3564410 D1	22-09-1988
			EP 0168959 A1	22-01-1986
			NO 852459 A ,B,	20-12-1985
			US 4719987 A	19-01-1988
US 4845686	A	04-07-1989	FR 2606158 A1	06-05-1988
			CA 1278085 C	18-12-1990
			DE 3773123 D1	24-10-1991
			EP 0267840 A1	18-05-1988
			JP 63116991 A	21-05-1988
			NO 874514 A	02-05-1988
US 6011753	A	04-01-2000	NONE	

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP2004/050527

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-16, 18, 19, 26, 32-45, 52, 58-60, 61b, 62

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-16,18,19,26,32-45,52,58-60,61b,62

This first group of claims solves the objective problem of improving positioning information applicable to a seismic survey system and method which comprises: a source array; an independently steerable deflector device to control the position of the array; and a positioning system comprising a positioning unit mounted on the array to determine the location of the source array with a controller operationally connected to controll the position of the deflector, by means of the special technical feature, as defined by the subject-matter of dependent claim 7, being the use of GPS positioning, thereby enabling more accurate 4D surveying.

---

2. claims: 17,20-24,46-50,61a,64a

This second group of claims solves the objective problem of improving the usability of the deflector in a seismic survey system and method which comprises, a source array; an independently steerable deflector device to control the position of the array; and a positioning system comprising a positioning unit mounted on the array to determine the location of the source array with a controller operationally connected to controll the position of the deflector, by means of the special technical feature being technical details on the construction of the deflector, thereby improving depth control and buoyancy characteristics as well as endurance.

---

3. claims: 27-31,53-57

This third group of claims solves the objective problem of preventing damage due to floating debris applicable to a seismic survey system and method which comprises: a source array; an independently steerable deflector device to control the position of the array; and a positioning system comprising a positioning unit mounted on the array to determine the location of the source array with a controller operationally connected to controll the position of the deflector, by means of the special technical feature being a forward looking acoustical transducer and receiver to enable obstruction detection and avoidance.

---

4. claims: 25,51,63,64b-79

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This fourth group of claims solves the objective problem of improving efficient adjusting of relative positioning of a plurality of source arrays in a seismic survey system without the otherwise necessary re-trimming of the available deflectors by means of the special technical feature being a winch attached to distance ropes mounted between the respective source arrays, thereby enabling adjustment of relative distances.

---